

In January 2007 *Consumer Reports* published their study of bacterial contamination of chicken sold in the United States. They purchased 525 broiler chickens from various kinds of food stores in 23 states and tested them for types of bacteria that cause food-borne illnesses. Laboratory results indicated that 83% of these chickens were infected with *Campylobacter*.

- Check the conditions for creating a confidence interval.
- Construct a 95% confidence interval.
- Explain what your confidence interval says about chicken sold in the United States.

$$n = 525 \quad \hat{p} = 0.83 \quad \hat{q} = 0.17$$

a) Independence: Yes

Random: Yes

10% Condition: $525 < \text{all chickens in U.S.}$

Success/Failure Condition:

$$\begin{aligned} n\hat{p} &> 10 & n\hat{q} &> 10 \\ (525)(.83) &> 10 & (525)(.17) &> 10 \\ 435.75 &> 10 \checkmark & 89.25 &> 10 \checkmark \end{aligned}$$

$$\begin{aligned} b) \quad SE(\hat{p}) &= \sqrt{\frac{\hat{p}\hat{q}}{n}} \\ &= \sqrt{\frac{(.83)(.17)}{525}} \\ &= 0.02 \end{aligned}$$

95% Confidence Interval:

$$\begin{aligned} \hat{p} \pm 2(SE) \\ 0.83 \pm 0.04 \\ (0.79, 0.87) \end{aligned}$$

c) We are 95% confident that between 79% and 87% of chickens sold in the U.S. are infected with *Campylobacter*.

The study described in the previous problem also found that 15% of the 525 broiler chickens tested were infected with *Salmonella*.

- Are the conditions for creating a confidence interval satisfied? Explain.
- Construct a 95% confidence interval.
- Explain what your confidence interval says about chicken sold in the United States.

a) Yes, see previous problem.

Only one that changes is Success/Failure Condition:

$$\begin{array}{ll} n\hat{p} > 10 & n\hat{q} > 10 \\ (525)(0.15) > 10 & (525)(0.85) > 10 \\ 78.75 > 10 \checkmark & 446.25 > 10 \checkmark \end{array}$$

$$\begin{aligned} \text{b) } SE(\hat{p}) &= \sqrt{\frac{\hat{p}\hat{q}}{n}} \\ &= \sqrt{\frac{(0.15)(0.85)}{525}} \\ &= 0.02 \end{aligned}$$

95% Confidence Interval

$$\begin{aligned} \hat{p} \pm 2(SE) \\ 0.15 \pm 0.04 \\ (0.11, 0.19) \end{aligned}$$

c) We are 95% Confident that between 11% and 19% of chickens sold in the U.S. are infected with *Salmonella*.